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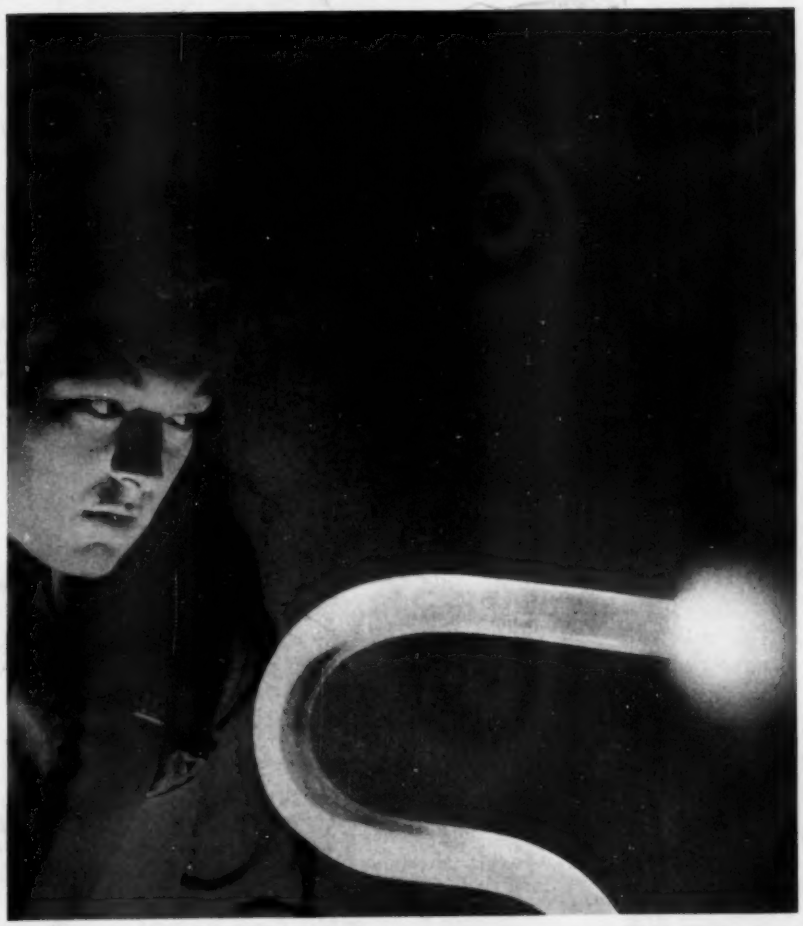
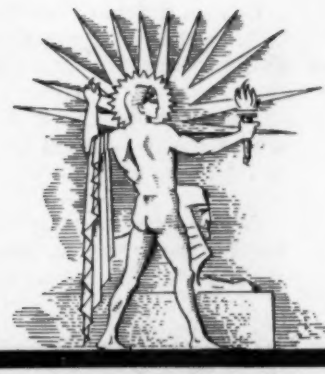
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





August 12, 1939

Piped Light

See page 106

A SCIENCE SERVICE PUBLICATION

Do You Know?

Stockholm has a museum of telephone, telegraph, and radio history.

Airplanes are used in spotting schools of fish for Japanese fishing vessels.

An earth slide at Grand Coulee Dam was stopped by freezing the loosened earth.

If a ton of soft coal could be delivered in one block, it would make a cube of about 2.8 feet.

Highway travel in this country will almost double by 1960, the Bureau of Public Roads foresees.

The poet Milton's blindness was due to detachment of the retina, a prominent eye specialist believes.

Fur farming is old in China—sheep, goats, and dogs have been bred for the pelts there for centuries.

A nature lesson on skunks, bats, and squirrels was recently televised for school children in Philadelphia.

One nutritionist's description of lettuce: pure filtered water, seasoned with vitamins, minerals, and calories.

The 3,000-foot cliff El Capitan in Yosemite Valley is called the world's biggest piece of unfractured granite.

A new inner tube for passenger automobiles is described as capable of sealing punctures during fast travel without loss of air.

The Antarctic is the shallowest of oceans, judging by its greatest recorded depth of approximately 14,274 feet.

Certain bad smelling sprays are found effective protection for trees, to keep cotton tail rabbits from gnawing them.

The chief result of billboard regulation, says one observer, has been to move the boards back farther from the highway.

Farmers can grade their own beef cattle by aid of a new system of body measurements and feed records worked out by the Department of Agriculture.

By observing how hyenas in a zoo attack meat bones of the ox, horse, and deer variety, a German scientist believes he can more expertly pick out in prehistoric trash heaps the bones gnawed by cave men and those gnawed by ancient animals.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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SCIENCE NEWS LETTER

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BOTANY

Better Cotton, Tobacco, New Berry Resulting From Drug

Colchicine, By Doubling the Number of Chromosomes, Juggles the Heredity and Produces Fertile Hybrids

BIGGER and better cotton, tobacco, berries and fruits, with new chemical-created heredities, are about to result from U. S. Department of Agriculture research through use of a powerful and poisonous drug, colchicine, in the most promising plant breeding experiments in years.

Fertile hybrids of economically important plants are being produced, successful plant crosses heretofore impossible are being achieved.

From pioneering experiments by Dr. Albert F. Blakeslee, Carnegie Institution geneticist several years ago, the application of colchicine, extracted from seeds of the wild meadow saffron and used sometimes as a gout remedy, promises to give farmers better plants to grow in their fields. (See *SNL*, Jan. 22, 1938)

The drug causes rapidly growing young plants to double the number of chromosomes in their cells, juggling the heredity in such a way that the new plant created breeds true and is not sterile as are most hybrids. Chromosomes are the carriers of heredity within the cells and seeds.

Crossing of valuable Sea Island cotton of the Asiatic variety and American upland cotton is being undertaken by Dr. J. O. Beasley of the Bureau of Plant Industry, working in North Carolina.

For the first generation this cotton cross produces a form which gives the typical long fibers of Sea Island cotton with the early maturity of the American upland cotton. This hybrid, however, while fertile, goes to pieces after the first generation cross and loses its desirable qualities.

Fertile Hybrid

The drug colchicine, by doubling the number of chromosomes in the cells of the plant, allows the production of a fertile hybrid of the cotton that will breed true.

To get a true-breeding strain depends on a freak of nature found commonly in Sea Island and at times in upland cotton. It is a twin embryo. Usually one of the embryos produces a shoot with only half the number of chromosomes in one set instead of the regular two sets required for fertility. By doubling the chromosome number of this shoot with colchicine, the scientists hope to get a pure-line cotton with two sets of identical chromosomes which should breed true.

Dr. H. H. Smith at the Arlington, Va., U. S. Department of Agriculture Experimental Farm has obtained similar results with hybrid tobacco which, in some forms, has great value as an insecticide. This is especially true of wild tobacco of which one type contains nornicotine, an alkaloid related to nicotine but much more potent in killing insects.

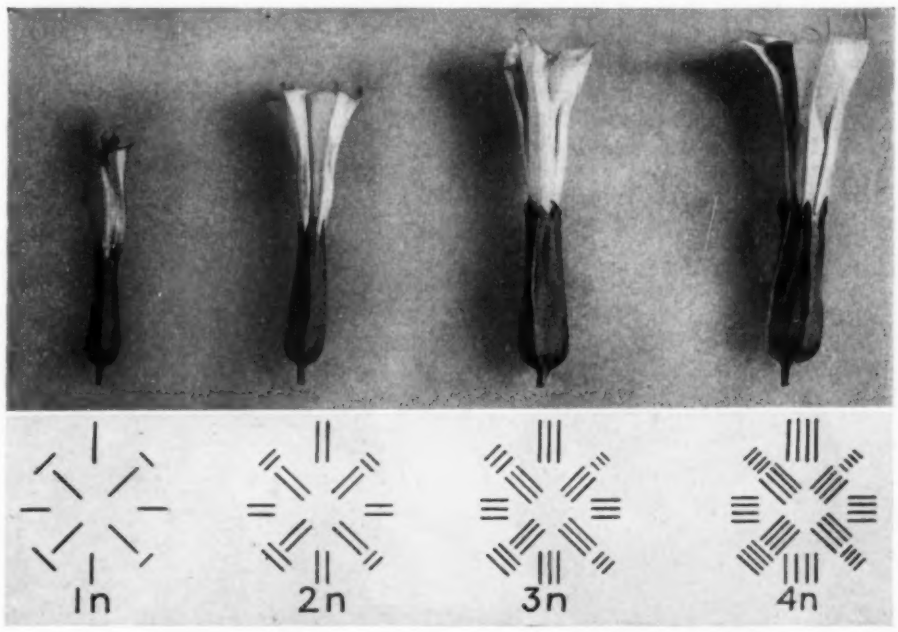
Drs. Haig Dermen and G. M. Darrow, working at Beltsville, Md., have tried colchicine on berries and fruit trees and hope to produce a permanently-reproducing cross between Loganberries and ordinary blackberries. Crossing of red raspberries with other berries is expected to yield a variety that will grow in warm southern climates.

The work with peaches has only just been done. What its results will be cannot yet be determined because it will take a year or two to obtain fruit from the trees.

Treating a young seedling or a growing shoot of a plant with colchicine often results in doubling the number of chromosomes. When the drug is applied as a weak solution, normal cell division is halted. Ordinarily, the chromosomes split and the same number of chromosomes pass to the two daughter cells. The drug destroys the mechanism which normally causes the two sets of chromosomes to pass into the two daughter cells. In such a state, the chromosomes split although the cell division is not completed. When removed from the solution the cell again starts normal division in which the chromosomes split again to give the new cells twice the number of chromosomes.

Unpaired Chromosomes

This doubling of chromosomes has, where successful, resulted in making sterile hybrids fertile. As an example, Asiatic cotton has two sets of 13 chromo-



MORE CHROMOSOMES: BIGGER FLOWERS

This photograph from SNL, January 22, 1938, shows flower sizes in strains of Datura, arranged in order of the number of chromosomes as shown in the diagrams below. These range from haploid (half-normal) on left, through diploid (normal) and triploid to tetraploid (twice normal). The changes in chromosome numbers were induced by colchicine. The photograph is used through courtesy of the Journal of Heredity.

somes. American upland has two sets of 26 chromosomes. A cross between the two has one set of 13 chromosomes from the Asiatic and one set of 26 from the upland, or a total of 39 chromosomes. Such a hybrid has two good reasons for being infertile. In the first place the chromosomes from the Asiatic are not sufficient in number to pair with those of the upland. The behavior of unpaired chromosomes in dividing cells is irregular. In the second place a 39-chromosome plant cannot distribute 39 chromosomes equally to form reproductive cells.

By doubling the chromosome number with colchicine this hybrid then has 78 chromosomes or two times 39. It has two sets of 13 and two sets of 26, or the same number as both parents. In this way each chromosome is provided with a mate from its own set thereby restoring regularity of chromosome distribution.

Science News Letter, August 12, 1939

BOTANY

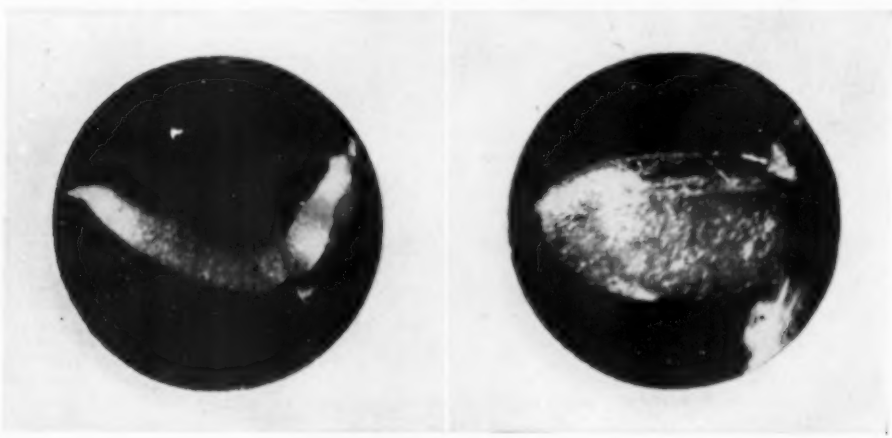
Former Remedy for Gout Aids Sugar Plant Growth

GIANT stalks of sugar cane, with diameters two or four times that of ordinary cane and with greater sugar content, promise to result from treatments with the drug colchicine in experiments by D. M. Weller, plant cytologist of the University of Hawaii and of the Hawaiian Sugar Planters' Association.

Among 10,000 seedling sugar cane plants treated, many giant stalks resulted. But Mr. Weller cannot yet state positively whether the larger stalks are the result of colchicine treatment or whether they are freaks of nature.

The drug colchicine has been applied to buds, seeds, and shoots of plants by scientists in the past few years with surprising results. The size of ears of corn has been increased and the vitamin content improved. Flowers of large size have also resulted from colchicine treatment.

Science News Letter, August 12, 1939



BIGGER SUGAR CANE

At the left is an untreated shoot of sugar cane, at right is an enlarged shoot produced by treatment with colchicine.

AERONAUTICS

Germany Abandons Airships Because They Lack Helium

Airline Formed in Germany to Operate Commercial Air Routes Using Airships Has Been Disbanded

GERMANY has completely abandoned the construction of airships and the famous factory at Friedrichshafen, out of which came the Graf Zeppelin, the ill-starred Hindenburg and more than 100 other lighter-than-air craft, is being converted into a conventional airplane factory, it is reported.

Failure to obtain helium, the safe lifting gas of which the United States has a virtual monopoly, or to develop a non-inflammable form of hydrogen, is blamed for the abandonment of the giant ships.

The Deutsche Zeppelin Rederei, formed to operate commercial air routes using airships, has also been disbanded and its personnel scattered throughout other branches of industry.

The decision was seen in U. S. aeronautical circles as possibly a "death blow" to the future of lighter-than-air craft. Germany and German technicians have been at least nine-tenths responsible for their development during the 40 years since Count Zeppelin first started experimenting with the cigar-shaped aerial vehicles.

Following the destruction of the Hindenburg when its hydrogen lifting gas caught fire as it came in for a landing at Lakehurst, N. J., on the evening of May 7, 1937, the German government attempted to purchase helium. A law permitting its export, for non-military purposes only and subject to the approval of the Munitions Control Board was rushed through Congress. But sale of the gas has been consistently blocked by Secretary of Interior Ickes, a member of the board.

The German embassy declared the abandonment of airship construction, reported by a British aeronautical journal, *Flight* (July 20) "is news to us."

The abandonment of the airship indicated also that reports of discoveries of helium in Germany are either untrue or do not involve enough helium to make airship operation independent of American supplies of the gas.

The destruction of the three largest U. S.-built airships, the Navy's Shenandoah, Akron and Macon, has almost killed interest in them in the United States. A bill authorizing construction of a new lighter-than-air craft for the Navy was passed by Congress, but bids submitted under it were rejected by the Navy Department.

Germany has indicated previously that experiments with the lighter-than-air craft would be dropped unless a safe substitute for the inflammable hydrogen could be found or secured.

Science News Letter, August 12, 1939

HISTORY

Blackbeard The Pirate, Public Enemy Number 1

BLACKBEARD the Pirate was public enemy number one in the news of 1718. This antiquarian find is reported by the National Park Service, which has been "digging" into early American news files.

You will hear more about this old-style public enemy, since the scene of his capture at Ocracoke Inlet, North Carolina, is in the new Cape Hatteras Na-

tional Seashore. This first national seashore to be authorized by Congress waits on one practical detail. Land or money for buying it must be donated, so Congress decrees.

Meanwhile, CCC men work at the sand dunes and Hugh R. Awtrey of the National Park Service regional headquarters at Richmond gets ready for questions tourists will ask about Blackbeard.

The pirate's doings were leading news for months, Mr. Awtrey finds, by studying the colonial press. At last, the public enemy was wiped out by five pistol balls and 20 "dismal cuts." His head, worth 100 English pounds reward money, was hacked off and the rest of him went down into Davy Jones' locker.

But it was a leisurely press that followed news of Blackbeard, or Capt. Edward Teach. Here was a sea rover whose lurid crimes make a Dillinger seem just a village rowdy, says Mr. Awtrey. Yet the only regularly issued newspaper in America, the weekly *Boston News-Letter*, was printing rumors of Teach's capture and contradictory denials for weeks after British Lieutenant Maynard had got his man.

Three months elapsed after Teach's death before the details got into the paper. Part of one sentence shows the journalistic style:

"Demelt struck in between them with his Sword and Cut Teach's Face pretty much; in the Interim both Companies ingaged in Maynard's Sloop, one of Maynard's Men being a Highlander, ingaged Teach with his broad Sword, who gave Teach a cut on the Neck, Teach saying well done Lad, the Highlander reply'd, if it be not well done, I'll do it better, with that he gave him a second stroke, which cut off his Head, laying it flat on his Shoulder."

If early American news was slow, it was vivid.

Science News Letter, August 12, 1939

An athletic field in Liverpool, England, can be thawed in cold weather by means of a network of electric wires underground.

●RADIO

Dr. Philip Fox, director of the Museum of Science and Industry in Chicago, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, August 21, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

GENERAL SCIENCE

Who Discovered Antarctic Is Still Unanswered Question

Pacific Science Congress Learns That Region Is Not All Ice; Little Evidence Supports Land Bridge Idea

WHO discovered the Antarctic continent?

In spite of centuries of exploration, extending back to the visit of Dirck Gherritz in 1599, this question remains unsettled, according to a paper presented to the Pacific Science Congress in Berkeley, Calif., by Dr. Bharne Aagaard, of Stavern, Norway. The paper gave a detailed account of the various claims, among which is included Bransfield's discovery of Trinity Land, January, 1820; Palmer's discovery of Palmer Land, November, 1820; Bellingshausen's discovery of Alexander Land, January, 1821; John Biscoe's discovery of Enderby Land, February, 1831.

Another question that remains to be settled is whether the Antarctic continent once formed part of a land bridge between South America and Australia. According to a paper presented by Dr. G. G. Simpson, geologist, American Museum of Natural History, New York, students of zoogeography have supported such a theory as a result of fossil finds along such a speculative bridge, but there is little substantial evidence to bear this theory out from a geological standpoint.

While Dr. L. M. Gould, geologist of Carleton College, Northfield, Minn., and geologist with Admiral Byrd in the Antarctic, advised the Congress that Antarctica possessed a unity of climate, life and geographic conditions which are without parallel among the continental land masses of the earth, the surface of the great continent is not all snow and ice. The inland ice does not completely submerge the rocky sub-structure. In and around Palmer Land, mountain glaciers of great variety, island ice and shelf ice are the characteristic forms in which glaciation is manifested. But little is known of the ocean margins, where the ice meets the major waters of the Pacific Ocean. It is reasonable to assume that the inland ice moves directly into the sea over wide areas.

However, the former lofty mountains of Antarctica have been greatly lowered through erosion and glacial action, according to a paper presented by Dr. F. Alton Wade, geologist of Miami University, Oxford, Ohio. Today some of those mountains are represented only by their igneous cores. Dr. Wade is also of the opinion that Palmer Land and related islands comprise a continuation of the Andean mountain chain of South America, while to the east in the Australian Quadrant is the great Antarctic Horst or depressed tract of the earth's crust, which is thought to be a continuation of the East Australian Horsts.

Climatically the continent of Antarctica exerts a tremendous influence over the whole south Pacific, according to Dr. Paul A. Siple, of Clark University, Worcester, Mass. While present knowledge of climatic conditions is restricted to only five or six areas where meteorological stations are maintained, Antarctica appears to be under the control of a shallow, glacial anticyclone which periodically exchanges across the southern Pacific Ocean great masses of cold polar air for warmer masses.

Both Drs. Wade and Siple have been with Admiral Byrd in the Antarctic and will be members on the forthcoming U. S. Antarctic expedition.

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Volcanic Eruption Forecast

TILTING of the ground near active volcanoes suggests the possibility of forecasting coming eruptive activities, it was reported by Prof. Takeshi Minakami, Earthquake Research Institute, Tokyo Imperial University.

Tilting on a large scale preceded by about two months the explosive activity of the volcano Mount Asama, which began on April 20, 1935, he said. The marked changes in the inclination of the ground during the active stage of the volcano clearly differ from the seasonal and other variations.

Marked changes in the crater floor of Asama during eruptions were described by Prof. Minakami. Two phenomena were noted, one wherein the floor rose as a whole and the other in which ex-

plosions ejected a part of the floor from the crater in the form of volcanic bombs and ash. These two conditions differ greatly in character.

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Fly Is Leprosy Carrier

THE COMMON house fly was indicted by a French scientist of the Pasteur Institute in Paris as a carrier of leprosy.

It is the only insect that carries the micro-organism causing the dread disease, Dr. E. Marchoux declared before the meeting.

However, conditions must be favorable for the disease generally before even the fly can transmit it, Dr. Marchoux said. Matters of environment, lack of cleanliness, climate and other factors enter into the picture.

Science News Letter, August 12, 1939

Pacific Raised Five Feet

TRANSPACIFIC aviation, using coral atolls like Midway Island as "stepping stones" on the long over-water hops, would probably not yet be possible if the land had not been raised some five feet in recent times, Dr. Harold T. Stearns of the U. S. Geological Survey, told the meeting.

There is a "five-foot bench" in the Pacific Dr. Stearns said. "So many coral atolls, as for example Midway Island, stand about five feet above sea level that there can be little doubt that an emergence of approximately five feet has occurred in recent time," he said. By "recent," geologists mean the epoch of time following the last Ice Age some 20,000 years ago.

Science News Letter, August 12, 1939

Pressure Linked to Quakes

IN CERTAIN regions earthquakes nearly always occur after a fall of atmospheric pressure, and in others after a rise in pressure, the fall being most common over the sea and the rise over the land.

This is indicated by a report by Dr. R. C. Hayes, acting director of the Dominion Observatory, Wellington, New Zealand.

He investigated the effects of atmospheric changes on the occurrence of 200 prominent earthquakes in the New Zealand region over the period of 1931 to 1936, noting the pressure change during an interval from one to two days before the occurrence of the earthquake. The results, plotted on a map, indicated that sea earthquakes were preceded by a fall of pressure and land earthquakes by a rise.

"As a fall of pressure indicates a removal of load," he said, "and a rise an increase of load, it is considered that the results give some indication of the general crustal movements at present taking place in the regions concerned."

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PUBLIC HEALTH

Precedent-Making Decision Needed in A.M.A. Case

Decision of Federal District Justice Proctor Does Not Necessarily Foreshadow Similar Opinions

FEDERAL District Justice James M. Proctor's decision throwing out the indictment of the American Medical Association on charges of violating the Sherman anti-trust law does not necessarily foreshadow similar opinions in higher courts which would end the government case, lawyers conversant with Federal court custom pointed out.

U. S. District courts almost without exception, one attorney said, do not hand down precedent-making decisions such as a sustainer of the indictment would be. The indictment broadens the legal term "trade" to include the practice of medicine as well as ordinary business.

Justice Proctor threw out the indictment of the A.M.A. for its attacks on Group Health Association, government employees' medical cooperative, on the ground that the Sherman act, as interpreted by the courts in the past, does not count medical practice as a trade. It is a learned profession and the law, he implies, does not say anything about restraint of learned professions. This is his opinion despite the fact that doctors in suing each other under common law have alleged "restraint of trade."

New departures in law, such as finding that the practice of medicine has become a "trade" in the last few years within the meaning of the Sherman law, are customarily left up to the U. S. Circuit Courts of Appeals and the Supreme Court.

"The government attorneys should have expected the decision," it was said. "Perhaps they did. It is many years since a District judge did anything but follow the custom."

The ever more liberal Supreme Court, which has shown a willingness to rewrite old legal terms in view of changed conditions today, may well be willing also to sustain the indictment.

Another possible avenue of attack for the Department of Justice in its determination to stop interference with cooperative medical groups, as foreseen in legal circles, involves stopping government payments to District hospitals which discriminate against the Group Health Association. Several still do.

Hospitals are paid out of District funds for charity cases they accept. In some instances, this is a substantial part of the hospital's income.

"Such payments of taxpayers' money to hospitals which discriminate against some of the taxpayers by refusing to accept G. H. A. patients may be illegal." This approach is seen in addition to the possibility, suggested by Attorney General Murphy, of summoning another Grand Jury and re-indicting the A.M.A. and its co-defendants.

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ZOOLOGY

Museum Immortalizes Turtle's Record Egg Laying

FROM expeditions that bring back for our museums strange and interesting things: A record turtle egg-laying performance of Mamma loggerhead on Sanibel Island off the Florida coast, 55 minutes for the entire nesting performance, leaving water, digging nest, laying eggs, covering with sand. It is soon to be immortalized by a habitat exhibit at Chicago's Field Museum of Natural History.

Two new and rare birds from Sumatra were gathered by George Vanderbilt's expedition for Philadelphia's Academy of Natural Sciences. One was a brown finch whose nearest relatives perished 32 years ago in a volcanic eruption; another was a thrush that a European might mistake for a blackbird.

Science News Letter, August 12, 1939

About one adult in 150 in this country is in a mental hospital.

ME AND MY SHADOW

Man shakes hands with his shadow at New York World's Fair.

ENGINEERING

Newest Vacuum Tube To Give Eleven Years of Service

New High in Length of Life for Such Devices Is Set By Mercury Vapor Thyratron Used to Turn AC to DC

A VACUUM tube that will give nearly eleven and a half years of continuous service, night and day, has been developed by Dr. A. W. Hull of the General Electric Company. The tube, setting a new high in length of life for vacuum tube devices, is a mercury vapor thyratron which is used to convert alternating current into direct current.

Tubes of this type carry very large electrical currents and can be used as commutators for direct current motors such as in elevators. They also are employed in experimental methods of power transmission by direct current.

The new tubes exceed by 100 per cent, in their probable length of life, the famous 50,000-hour tubes which early this year gained public notice by investigations of the Temporary National Economic Committee in Washington. Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, was questioned actively by the committee about vacuum tubes, giving 50,000 hours of useful service, which were employed by the telephone company as "repeaters" on its long-distance telephone lines.

High-cost precision construction explained the long-life of the telephone tubes. It was disclosed that while they were adaptable to the average radio set they would outlast the set several times and that the set would be obsolete long before its tubes were worn out. Their higher cost rendered them economically impracticable for ordinary radio use, it was explained.

Dr. Hull's new vacuum tube owes its long life, in contrast, to a new type of cathode which emits the electrons within the tube. Ordinary cause of tube failure, he explains, comes because the electron-emitting material on the cathode (barium oxide) is gradually used up and finally fails.

In the new Hull-type of thyratron there is built inside the tube a reservoir of the active electron-emitting material. Known as a "dispenser cathode" this reservoir serves the dual function of a heater (to make the electrons go off) and as a dispenser of the coating.

Some of the new type tubes have been in experimental service for 30,000 hours, or nearly three and a half years.

One tube, accidentally broken at about 20,000 hours was examined. It was found that less than half of the barium oxide supply had left its container at that time and that half of this half was still within the cathode enclosure doing its job of emitting electrons.

This means that 20,000 hours is probably less than a quarter of the life of the tube. This is the reasoning behind the statement that the tubes may last 100,000 hours or nearly eleven and a half years.

The thyratrons under test are carrying very high currents, 175 amperes, but have not yet shown any deterioration of their vacuum. The new tube is described in *Physical Review*. (July 1)

Science News Letter, August 12, 1939

PHYSICS

Man Loses His Shadow In World's Fair Exhibit

SHADES of Peter Pan! Science has done it. A man has lost his shadow! It's a piece of World's Fair scientific magic manufactured by G. E. There sits scientist-magician in front of a screen, coated with phosphorescent material, stuff that shines back light several minutes after the illumination is switched off. Where shadow was, there is no phosphorescence. So scientist-magician moves into another position. He shakes hands with his shadow. He slaps it on its back. He even rolls it up and puts it away! Next probable step: Use of this device in a detective thriller, G. E. scientists consulting.

Science News Letter, August 12, 1939

GEOLOGY

Pacific Coast Glaciers Have Their Age Reduced

THOUSANDS of years of antiquity are shaved off the glaciers of the Sierra Nevada mountain range on the Pacific Coast when Francois E. Matthes of the U. S. Geological Survey told the Sixth Pacific Congress at Berkeley, Calif., that they are not remnants of ancient "ice age" glaciers but a new crop born as late as 4,000 years ago.

Large glaciers of the Pacific Northwest have survived from the Pleistocene or ice age epoch of about 10,000 years ago, Mr. Matthes said.

Science News Letter, August 12, 1939

MEDICINE

Fertility Vitamin E May Aid Weak Muscle Sufferers

THE FERTILITY vitamin E may come to the aid of patients suffering from muscular dystrophy, an ailment of muscular weakness and wasting, it appears from investigations by Drs. Nobuko Shimotori, Gladys A. Emerson and Herbert M. Evans of the University of California.

Guinea pigs that suffered from this condition as a result of a faulty diet were helped by the fertility vitamin, the California investigators have reported (*Science*, July 28).

"Human use of vitamin E has not yet been accomplished," Dr. Evans, discoverer of this vitamin, replied to a Science Service inquiry.

He did not say, however, that the vitamin would not be tried on human patients. The vitamin is found most abundantly in wheat germ, and is available in pure form as alpha tocopherol.

Science News Letter, August 12, 1939

METALLURGY

Tin Near Top on List Of Strategic Materials

NOW that surplus American cotton is to be swapped for British rubber from the East Indies, tin is near the top on the list of strategic materials still needed by the United States for wartime emergencies. Our nation needs stock piles of tin badly.

The average American yearly requirements for fresh new virgin tin amounts to nearly 75,000 tons, the new forthcoming issue of the *Minerals Yearbook* of the U. S. Department of the Interior will state. The average American production of tin, in sharp contrast, is only 100 tons. This tremendous difference represents amounts of tin that must be imported over wartime-dangerous trade routes from British Malaya and from Bolivia, Siam and China.

The major American use of tin is in the humble tin can vital for modern methods of preserving foods in peace and wartime alike. The tin can, it should be noted historically, had its origin in preserving foods for British Naval expeditions just about 100 years ago.

Equally vital, too, for peace or war is the use of tin in solder which joins the intricate electrical connections that make possible the wonders of modern radio, telephone and telegraphic communications.

Tin, too, is vitally needed for the transportation industry where babbitt metal—a tin alloy—is used time and again for bearings. Collapsible tubes for toothpaste and the like, and the tough alloy bronze are other important uses of tin.

Other nations, it is known, are laying in large reserves of tin. Soviet Russia, for example, acquired between 20,000 and 25,000 tons of the metal during 1937 and 1938. Sharp increases in tin shipments have also been made to Japan, Germany, Poland and Sweden. The only American reserve worth mentioning is that of the U. S. Navy which amounted to 2,190 tons as of March, 1939.

Completely out of the American picture, following exhaustive geological exploration, is the hope of establishing tin mining in the United States or in Alaska. A total production of 100 tons yearly is a mere drop in the tin bucket. Establishing tin smelters in the United States, too, is looked upon with but little favor.

Science News Letter, August 12, 1939

ENTOMOLOGY—AERONAUTICS

Insect Menace Endangers Proposed British Airline

AN INSECT menace endangers the aerial life-line that England is rather quietly planning to establish to India and Australia via Africa; fear of Nazi-Italian interference with the present Imperial air route through the Mediterranean makes an alternative airway highly desirable. Tucked away in the current batch of Letters to the Editor of London's *Nature*, is a scientific warning of wings over Africa—not wings of bombers but of tiny insects carrying disease.

"It would seem unwise to start an airline from or via Africa to India and Australia until the problem of control of insects in aircraft has been solved," writes Dr. F. G. Sarel Whitfield, entomologist of the Imperial College of Science and Technology, London.

Reason: Yellow fever exists in Africa. Mosquitoes carry it. These insects steal rides on airplanes. One infected mosquito might carry a plague to India worse than any human invasion could possibly be.

No theoretical warning is this. For four years entomologist Whitfield has inspected airplanes at Khartoum airport, finding 1,960 insects hitch-hiking on over 2000 airplanes including plenty of mosquitoes capable of carrying the dreaded jungle yellow fever.

Science News Letter, August 12, 1939

IN SCIENCE

BOTANY

Honey Acts as Hormone To Grow Roots on Plants

CHEMICALS, phytohormones, make roots grow on cuttings of plants where none would grow before, even root "whiskers" on stems and leaves. For propagating plants hard, or hitherto, impossible, to raise from cuttings, these chemicals are a boon to gardeners and nurserymen.

Now from Ottawa's Central Experimental Farm comes news that honey, the sweet stuff that man robs from bees, acts as phytohormone. In careful tests by R. W. Oliver it was even better than a very successful commercial phytohormone powder preparation.

Most extensive tests were made on familiar varieties of chrysanthemums but evergreen tree cuttings respond also. Dilute honey with 3 parts water to one of honey. Stand the cuttings in this solution for a day and a night and then plant. Probably some hormone substances in the bee food pep up the root growth, just what is not known.

Science News Letter, August 12, 1939

AERONAUTICS

Breakwater To Be Built For Airliners at Horta

FAYAL Island's swells, current headache for transatlantic air clipper skippers because of the impossibility of taking off with a full load when they are rolling at this refueling stop, will soon be a problem no more. The Portuguese government will start this fall construction of a long breakwater enclosing an area on Horta Bay large enough for flying boats to take off and land inside.

The project will cost more than $1,000,000 and is coupled with the digging of a tunnel through the peak which makes up most of the island and which will enable speedier communication between the two sides of the island.

At present aircraft of Pan American Airways, American Export Airlines and Air France Transatlantique make use of five different landing areas, depending on weather conditions, all outside the rather small seawall.

Science News Letter, August 12, 1939

NCE FIELDS

STATISTICS

200 Deaths in a Year From Diving Accidents

BROKEN necks, fractured skulls, and other serious injuries received in diving accidents result in at least 200 deaths in the United States each year. In the case of 100 Metropolitan Life Insurance policyholders killed in diving accidents, 68 lost their lives because they failed to judge the depth of the water properly or did not estimate the depth needed for a dive correctly. They struck the bottom with considerable force and usually the impact resulted in a broken neck. The next most important cause, which brought about the deaths of 18 out of the hundred fatalities, was striking the head against submerged objects, mostly rocks. The other 14 deaths were caused by such unsafe practices as: Two persons diving simultaneously and striking their heads under water; diving too close to a dock guard and striking it; falling flat after a high dive; swinging from a diving board and hitting the head against the concrete side of the swimming pool.

Science News Letter, August 12, 1939

METEOROLOGY

Weather Forecasting in 1990 Predicted by Meteorologists

HOW will weather be forecast in 1990, fifty years in the future? This is what Dr. Willis R. Gregg, Weather Bureau chief, asked fellow meteorologists shortly before his sudden death last fall. He was preparing a presidential address for the American Meteorological Society that he did not live to deliver.

Greater use of the radiosonde, the robot observer carried aloft by balloons, is predicted in many of the replies from America's foremost meteorologists. The present Weather Bureau chief, Comdr. Francis W. Reichelderfer, then attached to the *U.S.S. Utah,* expected that floating radio robots would keep tab on the weather in open ocean spaces, flashing regular messages to allow charting of ocean conditions.

A promising future for consulting meteorologists, serving many businesses and industries, is also foreseen by Comdr. Reichelderfer, who feels that hundreds of concerns need individual weather advice as much or more than oil companies need geologists.

A new instrument, one that "feels" the weather like a person, welding temperature, humidity and wind movement into one value, is needed in the opinion of W. C. Devereaux, U. S. Weather Bureau senior meteorologist at Cincinnati.

If rockets become practical, they will be used to gather weather data from high in the atmosphere.

Agricultural forecasts that look forward weeks and months to allow the farmer to plan his plowing, planting and harvesting are foreseen by J. B. Kincer, the U. S. Weather Bureau's climate and crop weather expert.

Dr. W. J. Humphreys, noted meteorological physicist of Washington, expects television to allow the forecaster to see the sky at any place, far or near, when he wishes to see it.

Maj. E. H. Bowie, U. S. forecaster at San Francisco, believes that a study of water vapor in the air will unlock many weather secrets.

Looking a century into the future, T. A. Blair, of Lincoln, Nebr., suggests that it may then be possible to control the weather, and a WDA (Weather Distributing Administration) and even wars over weather control will result.

Science News Letter, August 12, 1939

METEOROLOGY

Better World Weather Map May Come from Expedition

BENEFITTING world agriculture and industry, a more complete world weather map and more accurate long range weather forecasts may result from the first federally-sponsored expedition to the Antarctic.

Daily weather reports may be radioed back to "civilization" in later years if more or less permanent Antarctic bases are maintained, Admiral Richard E. Byrd, commander of the expedition, said. He attended a conference under the auspices of the National Academy of Sciences and the National Research Council to map plans for scientific studies by the expedition, which will leave from Boston in October. Thirty-two scientists, representing 20 government agencies and nearly a dozen private scientific institutions, attended.

Dr. Isaiah Bowman, geographer and Johns Hopkins University president, was chairman of the conference.

Science News Letter, August 12, 1939

ENTOMOLOGY

World Champion Jitterbugs Are Larvae of a Wasp

WORLD champion jitterbugs, nominated by scientists at New York State College of Forestry at Syracuse, are larvae of a wasp, half-mosquito size, technically known as Neuroterus saltarius. Wasps lay eggs on pin-oak leaves. The larvae hatch, build little shells, pinhead size. They start a wild dance on dropping to ground. The wriggling of the larvae causes standing-start bounces 20-30 times sizes of dancing globes. The equivalent human performance would be springing into air 150 feet several thousand times. Reason for the larvae bounding: To achieve a crevice in ground to spend the winter. Next performance: Next year.

Science News Letter, August 12, 1939

GENERAL SCIENCE

U. S. Scientific Population Is Centered In Ohio

THE EDUCATIONAL center of the U.S.A. is in Ohio near Cincinnati, measured by geographical distribution of college students, and for scientific societies Columbus and Cincinnati are the big cities closest to their geographical centers of memberships.

Prof. Cecil B. Read, University of Wichita mathematician, has discovered these facts with the help of NYA students. His investigations were begun because a few years ago a society of scholars held a meeting at Richmond, Va., in response to suggestions that a western meeting be held. Those members west of the Mississippi rather felt that they were being ignored.

The geographical center of scientific population is farther east than the center of the general population as determined by the U. S. Census Bureau. Since 1890 the center of U. S. population has been in Indiana. In 1880 it was closest to the present center of college student population determined by Prof. Read. Members of the Geological Society of America group about a geographical center very close to the present center for the whole population, while the western oil fields cause the center of population of petroleum geologists to fall near Oklahoma City.

Columbus and Cincinnati are excellent convention cities for scientific societies, Prof. Read reports (*Science*, July 21) for the total number of miles of travel for every member would be a minimum.

Science News Letter, August 12, 1939

CHEMISTRY

"Glass" from Coal

Natural Gas or Oil Also Used With Water and Air To Make Clear Transparent Plastics for New Uses

By WATSON DAVIS

See Front Cover

"GLASS" made from coal or natural gas or oil, water and air. Transparent stuffs of a new sort that rival and surpass in some respects ordinary glass, conventionally the transparent material for thousands of years.

Organic glass, plastics or synthetic resin, that can be used for jewelry, window panes, dishes, boxes you can see through, even eyeglasses, lenses for cameras and new medical aids. Lighter, less brittle, more flexible than the familiar glass made from sand.

Promising new materials for tomorrow are these new kinds of chemical "glass" which are first cousin to the more familiar and usually opaque plastics and resins used in increasing quantities for radio cabinets, automobile parts, and thousands of other things for daily living.

Acrylic resins, vinyl resins, polystyrene, these newer transparent synthetics are called. You'd better learn at least their family names because they are sure to cut quite a swath in chemical society.

Useful as synthetic "glasses" also are older chemical resins, longer used in industry, that now have acquired greater transparency, thanks to research. The granddaddy of synthetic resins, born of two disinfectants, phenol and formaldehyde, and its later variant made of urea and formaldehyde, can be made white and transparent. There are also cellulose compounds made from wood and cotton that have become very common and rank with glass in some utilizations.

One You Should Know

Particularly you should know polymethyl methacrylate, which goes into commerce here and abroad under a long list of trade names. This resin is the most transparent and most promising of the newer kinds of colorless synthetic resin glass competitors, the one most widely used so far. Lucite is what du Pont calls it, while Röhm & Haas label it Plexiglas and Crystalite.

So clear, water-white and brilliant is polymethyl methacrylate that one of its principal exhibition pieces consists of a huge "diamond" that would weigh some 57,000 carats if it were really carbon crystal instead of the chemical synthetic. You may have seen it at the two world's fairs, and mistaken it for glass. You can tell it from glass by its complete freedom from color and perfect transparency. It is being used in signs and displays, in airplane and bus windows, and in transparent models. The famous transparent automobile has this synthetic resin for its outer coating.

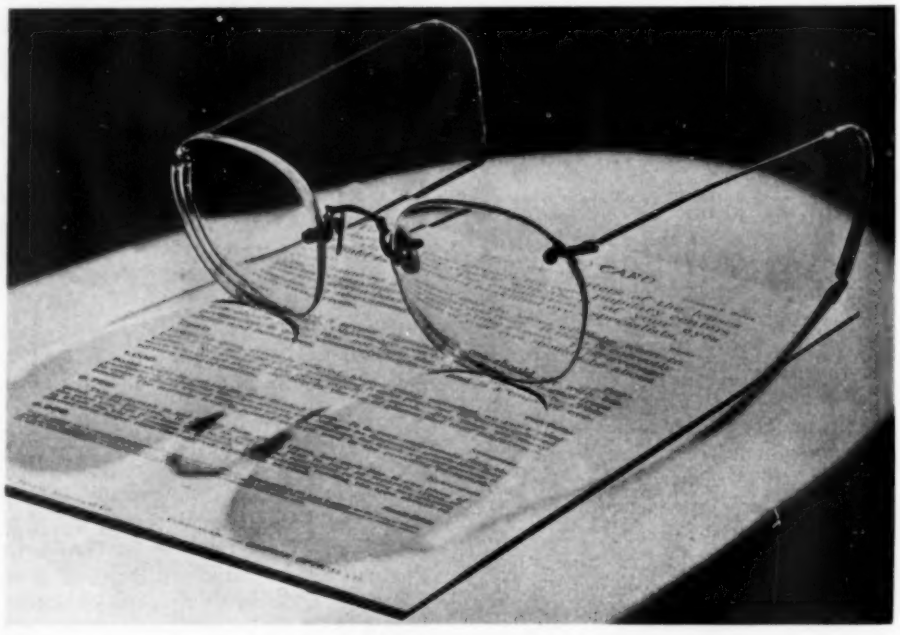
Clearer than optical glass, it weighs half as much. As it is not easily shattered one of its first optical uses is in safety goggles. Ordinary eyeglasses, especially for playful children, can be made from this novel material, which can be ground and polished like glass. Standard shaped lenses can be molded to exact size without costly finishing. A related use is for making the reflectors that line and mark the edge of highways.

These Stimson reflectors present a myriad of facets, formed by protrusions, each of which is a corner of a cube. Polymethyl methacrylate is suitable for the manufacture of these reflectors because it can be molded with the extreme accuracy requisite to effective reflection, and because it will tolerate prolonged exposure to rain and sunshine.

New Jobs

The acrylic resins do some jobs that glass cannot do. They have the happy property of total internal reflection, unpossessed by ordinary glass, one of the features of fused quartz that makes it valuable. This means that it can be used to "pipe" light, pouring it around corners of a rod of the resin. It has made possible new surgical accessories useful in medical practice and dentistry, rods that deliver light to inconvenient places in the mouth and other human anatomical locations. It allows the production of novel effects in illuminated display signs.

An S-bar of plastic showing dramatically how it "pipes" light appears on the front cover of this week's SCIENCE NEWS LETTER. The photograph is by Fremont Davis, Science Service staff photographer.



HARD TO BREAK

Valuable and important use of the new transparent plastics, created in chemical laboratories, is in low-cost spectacles whose lenses are made by molding rather than by costly grinding. Such spectacles have been suggested for school children too poor to afford the ordinary kind.

"GLASS" CAR

An exhibition motor car whose body is made entirely of transparent plastic provides a striking World's Fair demonstration for both the automotive and the plastics industry. The demonstrator examining the tire can see his wrist watch through the clear fender.

Polystyrene is another "organic glass" that is clear, transparent, and resistant to alcohol, many acids, and water. It consists of a long chain of molecules made up of carbon and hydrogen. Although it is only now coming into commercial use, it is called the "oldest synthetic organic plastic" because styrene was first produced nearly a hundred years ago and was thus one of the early organic compounds to be synthesized. Styrene is a colorless liquid that when heated or exposed to light thickens and becomes finally a hard, transparent substance, called polystyrene. Styron is the trade name of the Dow Chemical Company polystyrene, and it is also sold under the inclusive Bakelite label.

New Filling

The most modern filling in the glass sandwich that makes safety glass for auto windshields and windows is one of the other plastics, polyvinyl butyral. The old material used as a film in the center of laminated glass was cellulose nitrate and cellulose acetate, but these have the disadvantage of getting brittle in cold weather and not being too permanent. The newer vinyl resin, mixed with a considerable proportion of an appropriate plasticizer, is an almost ideal safety glass plastic, remaining non-brittle at all times, even in cold weather. It prevents flying of broken glass fragments and needs no sealing around the edges for weather protection. Vinyl resins also give promise of usefulness in transparent sheets and other forms. Vinylite is the trade name given vinyl resin by Carbide and Carbon Chemicals Corporation, while the du Pont label is Butacite, and Shawinigan Products Corporation names them Alvar, Butvar, Formvar and Gelva.

You will notice that "poly" appears in the chemical names of many of these and other synthetic resins. Meaning "many," it refers to the joining of many identical molecules to make the useful compounds. Many molecules of the substance string along together, joining chemical hands. This process is called by the chemist, polymerization. And the products formed are polymers. Practically all the newer transparent synthetic "glasses" are polymers.

Carbon, hydrogen and oxygen are the elemental building blocks used in the chemical construction of most of these synthetic materials. Of course, these are among the atoms used in building all organic substances. The raw materials used in the manufacture of the synthetic resins are relatively cheaply made chemicals obtained from coal, gas and petroleum, useful as rich chemical storehouses as well as fuels. Air and water join in the chemical synthesis often, as they do in almost everything else in the organic world.

One of the Wonders

One of the wonders of modern chemistry is that it is possible to build up almost any organic compound from such cheap, plentiful substances. For instance, ethylene obtainable from petroleum is a starting point for the acrylic resins, vinyl resins, and polystyrene.

The older and original commercially successful synthetic resin, made of carbolic acid (phenol) and formaldehyde, invented by Dr. Leo H. Baekeland, is usually opaque brown in color. It can now be made approximately water-white and transparent, as well as in various colors. It also can be called a synthetic "glass." There are also transparent urea-formaldehyde resins.

Several other plastics, notably cellulose nitrate (pyroxylin) and cellulose acetate, familiar as base for photograph film, are transparent. But they are not sufficiently hard and lack other properties that would allow them to compete with glass. Both of these are made from the cellulose in wood or cotton. So also is a similar material that has come into more recent use, ethyl cellulose. These are more likely to be met with as films and coatings competing with paper, cloth and even paint rather than with glass.

Plastics take their place as common materials for industry and home alongside wood, metal, concrete, paper, cloth, and other familiar things.

In the cities of tomorrow the houses will have transparent wall panels where desired. They will be molded or cast of new synthetic "glass" resin. Furniture of the future can be transparent but non-shatterable. Artists have a new material with which to work. Machinery that needs watching can have plastic housing that can be seen through. Imagine the uses of a "glass" as unbreakable as wood. Chemistry is making it a lighter, brighter world in which to live.

Science News Letter, August 12, 1939

MEDICINE

Hay Fever Victims Warned Against Severe Chilling

JUST in time for the late summer and early fall hay-fever season comes a warning to sufferers to guard against getting chilled, either by cooling breezes on a motor trip, an electric fan or super-cold air-conditioned theaters, restaurants and the like. The warning, by a hay-fever authority, Dr. Harry S. Bernton of Washington, D. C., appears in a new book, Hay-Fever—What To Do About It (Ransdell).

Hay-fever victims suffer from allergy which means "altered reactivity," Dr. Bernton explains. Their reactivity is altered not only toward the particular pollens which make them sniffle and sneeze but also toward temperature changes. Their heat-regulating mechanism is deranged. One victim described it by saying his "thermostat was out of order."

The cool breezes of an electric fan, the chilled air of a theater or train in summer, may make the normal person sneeze merely once or twice, but it is sure, in Dr. Bernton's opinion, to bring on a bad attack of hay-fever in the allergic person. The chilling constricts the blood vessels of the skin, driving the blood into other parts of the body, including the tissues of the nasal cavities. The consequent swelling of these tissues provokes and accentuates the trouble the hay-fever sufferer is already having with his nose.

Science News Letter, August 12, 1939

BEST PRESERVED SKULL

Prof. Sergio Sergi indicates opening at base of head which makes him think Neandertal man walked upright.

ANTHROPOLOGY

Most Perfect Neandertal Skull Is Being Studied In Rome

Particularly Well Preserved Occipital Opening Makes Professor Sergi Conclude Neandertaler Walked Upright

FOLLOWING its discovery in a cave at Monte Circeo, a promontory on the Tyrrhenian sea, fifty miles south of Rome, the world's most perfectly preserved specimen of a Neandertal skull is being studied by Prof. Sergio Sergi, head of the Institute of Anthropology at the Royal University of Rome, in an effort to uncover new racial characteristics of this early man.

Both Prof. Sergi, and Prof. Alberto Carlo Blanc, who first identified the skull on the scene of discovery, say it is in an almost perfect state of preservation except for a fracture in the right temporal area. This was caused by a series of blows on the head, probably during a battle with clubs, and caused death between 70,000 and 80,000 years ago.

In addition to the anthropological importance of the skull, which is the third of its type found in Italy, fossilized bones of animals discovered in the cave give evidence of Neandertal man's mode of life. The bones include fragments of those of prehistoric elephants, rhinoceri, and giant horses, all showing evidence of fractures. The floor of the cave was literally paved with these bones.

Discovery of the cave was made by accident on the property of Antonio Guattari, owner of a small resort hotel at Monte Circeo. While digging foundations for enlarging the hotel, workmen found the entrance which had been sealed as the result of a landslip, believed to have occurred during the last glacial period, about 80,000 years ago. The skull was found in a large open space at the end of a passage in a crude circle of stones. It had lain there untouched for all these thousands of years. Guattari notified Prof. Blanc, who completed the investigation, and brought the skull to Rome. Failure to find any bones of the skeleton leads to the belief that the skull may have been brought to the cave and possibly used in a sacrificial ritual. Other bones found on the floor of the cave have been identified as those of bears, deer, panthers, goats, and hyenas.

According to Prof. Blanc, scores of caves and grottoes in the Monte Circeo area were formed when the sea was thirty to forty feet above the present level, and its action scooped out hollows in the soft rock. At the beginning of the last glacial period, formation of ice fields caused the sea level to drop. It was then prehistoric man found the dry grottoes and began living in them. Slowly a new change of climate took place causing sudden rises and drops in temperature. Alternating periods of freezing caused splitting of rocks and landslips, burying the caves under masses of stone and earth. In the post glacial period, melting of ice caused the sea to rise again, washing away the earth in many of the grottoes, but failing to reach the height of the cave of the Neandertal skull, leaving it sealed until the accidental discovery.

Following the finding of the skull, the cave was closed by the Italian Paleontological Society, but exploration will be continued in the fall after assembling and cataloguing the bones taken out during first excavations. Two other Neandertal skulls have been found in Italy, one in 1929 and the other in 1935, both in the Sacopastore region, near Rome, but neither is as well preserved as the new discovery. However, the occipital opening at the base of one of the skulls was particularly well preserved, enabling Prof. Sergi of the Royal University to conclude for the first time that Neandertal man walked erect, and not with an ape-like posture with head thrust forward as previously believed. The horizontal plane of the opening in the skull shows, he believes, that the bones of the neck fit perpendicularly onto the opening causing posture to be erect, as in present day man.

Science News Letter, August 12, 1939

PSYCHOLOGY

It Is Not Kind to Child To Keep Reality From Him

PUTTING a child in a s rt of pink and white padded cell of protection where he has no contact with the world's sorrows and cruelties may be a satisfaction to adults but is really no kindness to the child.

The great importance for the mental health of the child of leading him gently but firmly into contact with reality is stressed by Dr. Lili E. Peller, child psy-

chiatrist. (*American Journal of Orthopsychiatry, July*)

We frequently hear the statement that "our century has discovered the child," but Dr. Peller holds that to a certain extent at least we have invented today's child.

"His playfulness, his cheeriness, his imagination, in short, his childishness is overrated," Dr. Peller said. "All the instances where he is showing apprehension, like an adult, and reasonably tries to act like one, are ignored.

"We surround him with pink and white dresses, with saucers and wallpapers with funny drawings and carefully hide all the cruel things of life.

"Why? Partly solicitude, fully justified for the immature. There are other unconscious motives."

The adult who pretends and tries to insure that childhood is entirely gay and carefree is using the child as a means of escape from the unbearable cruelties of his own life just as games and movies with a happy ending are used and just as kings in an older day turned to court jesters when the burden of the crown became too heavy.

"America's number one movie star is a child, and adolescents come next. Is this due to their supreme art or to the fact that they are children and thus more capable than any adult dramatic genius of lifting us out of this dull and oppressing world?" Dr. Peller asked.

We have no right to use our children for such purposes when it means hindering their development.

Children's fears can be relieved without shielding them from reality by teaching them to anticipate reasonably what will happen next. It is the unknown that is most alarming.

Science News Letter, August 12, 1939

AERONAUTICS

Pick-Up Airmail Service To Include Air Express

ALL-AMERICAN Aviation, Inc., the airline now operating an experimental airmail pick-up service to small towns along two routes, is undertaking carriage of air express, Richard C. duPont, president, announced.

Packages up to 35 pounds in weight can be delivered and parcels weighing as much as 20 pounds can be taken on board in flight.

The planes do not stop at intermediate points, merely taking on and discharging mail and express by means of a grappling system invented by Dr. Lytle S. Adams, Irwin, Pa., dentist.

Science News Letter, August 12, 1939

MEDICINE

Mayo Clinic And Foundation Organized To Carry on Work

Son and Sons-in-Law of Founders Are on Staff; Foundation Constantly Trains Men for Clinic

THE DEATH of Dr. William J. Mayo, following by just two months the death of his brother, Dr. Charles H. Mayo, leaves the Mayo Clinic and the Mayo Foundation well organized to carry on the healing and educational work of the famous brothers who built up the institutions from the practice of their country doctor father, Dr. William Worral Mayo.

A son of Dr. Charles, Dr. Charles William Mayo, and two sons-in-law of Dr. Will, Drs. D. C. Balfour and Waltman Walters, are active members of the staffs of the institutions. Dr. Walters and young Dr. Mayo are on the surgical staff of the clinic and Dr. Balfour is director of the Mayo Foundation. This latter is a research and teaching institution, part of the University of Minnesota. While patients are treated at the Clinic and affiliated hospitals, it is at the Foundation that young doctors and surgeons are trained to staff the Clinic and similar institutions elsewhere, and it is from the Foundation that come new methods of fighting sickness and death.

When the Mayo brothers endowed this Foundation, they arranged for its affiliation with the University because they felt that "foundations which depend on self-continuing bodies of trustees may do well for the first and second generations but there is the hazard that in later periods new trustees who are unfamiliar with the spirit and ideals of the founders may through lack of understanding defeat their purpose."

"The fund which we had built up and which had grown far beyond our expectations had come from the sick," Dr. William J. Mayo wrote to the University of Minnesota, "and we believed that it ought to return to the sick in the form of advanced medical education, which would develop better-trained physicians, and to research to reduce the amount of sickness. My brother and I came to the conclusion that this purpose could be best accomplished through the state university."

The continuation of the Mayo Clinic seems as well assured as that of the Mayo Foundation. For several years before their deaths, the Mayo brothers had retired from active participation in the direction of the Clinic, feeling that this should be left to younger men who would not be hampered by the tendency to conservatism and clinging to tradition that is likely to come with advancing years. Dr. J. C. Masson was made chief of the surgical staff in 1936.

The two Mayo brothers continued to see a few patients in their offices and to make rounds in the hospitals occasionally. The majority of the thousands of patients coming to the Clinic in recent years, however, have been treated by other members of the staff. It is safe to say that more thousands will continue to find these same staff physicians and surgeons carrying on the battle against disease and suffering that Dr. William Worral Mayo started more than half a century ago on the now world-famous corner of First Street and Second Avenue Southwest in the country town medical center of Rochester, Minn.

Science News Letter, August 12, 1939

Motion picture cameras attached to captive balloons are being used to study traffic speeds and behavior of drivers.

American farms are producing materials that go into more than 230 nonfood manufactured items.

BOOKS

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BEFORE HITLER

This is no Nazi emblem. It was unearthed in the floor of a villa destroyed in Greek Olynthus in 348 B.C.

ARCHAEOLOGY

N and Z Turned Backward Clue to Swastika "Magic"

Rotation Symmetry Which Makes Swastika the Same When Turned Upside Down May Account for Popularity

THE swastika, which Nazi Germany uses as its insignia, turns up in archaeological findings in almost every land.

Its oldest appearance, thus far, is on a painted cup from Susa in Mesopotamia, made earlier than 3000 B.C. In Asiatic Turkey, metal workers of 2000 B.C. used the same design in copper standards. In Greek Olynthus, destroyed 348 B.C., the floor of a villa unearthed not long ago revealed a swastika, and in the same room the inscription "Aphrodite kale," meaning love is beautiful.

The swastika appears on Buddhist art in India. And in second century China it was a sun symbol. Ancient Hebrews used it, and with Indians in America it has been a popular design.

Why this cross with hooked arms should be one of the oldest designs in the world and one of the most fascinating for mankind is a puzzle. A University of Michigan physicist, Prof. S. A. Goudsmit has offered a psychological clue. He suggests that, when you see an uneducated person's printing of capital N, Z, or S reversed, you have a glimpse into primitive and ancient confusion over "rotation symmetry."

Sorting out the letters of the alphabet, he finds that in eight there is no symmetry at all. In seven, the left half is the mirror image of the right. In four, the lower half mirrors the upper. But three, the significant N, S, and Z, can be rotated over half a circle without changing, and look the same upside down. The remaining four letters combine all the characters mentioned.

Prof. Goudsmit thinks the rotation symmetry of N, S, and Z is probably harder to grasp than the mirror reflection symmetry of a M or an A. This may explain why many ancient magic symbols, which must be made just so, followed rotation symmetry over a half, third, or quarter of a circle. And it may help us to understand why various people independently were attracted by symbols like the swastika.

Science News Letter, August 12, 1939

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MEDICINE

Sulfanilamide May Be Dangerous In Syphilis

SECOND case of a patient dying from acute hemolytic anemia resulting from the use of sulfanilamide, new chemical remedy effective in a large variety of diseases, is reported by Dr. Simon Koletsky of Cleveland. (*Journal, American Medical Association,* July 22)

In both this and the previously reported case the patient had syphilis. Dr. Koletsky raises the question as to whether some alteration in the blood-forming mechanism of the body incident to syphilis may be responsible for the fatal outcome.

Science News Letter, August 12, 1939

ASTRONOMY

Return of 1788 Comet Is Believed Discovered

A COMET, located in the east just before sunrise on a line between the bright stars Capella and the "twins" Castor and Pollux has been discovered by a French observer, Roger Rigollet. It had a very fast motion (eight times the

apparent diameter of the moon each day, or four degrees) and is difficult to sight.

Rigollet, however, may not have his name attached to this new comet as is the custom, for Leland Cunningham, Harvard astronomer, reports that a check on the comet's orbit shows it to be virtually identical with one found in 1788 by Caroline Herschel, sister of the great English astronomer, Sir William Herschel, herself a first class astronomer.

Almost every point of the orbit computed by Miss Herschel 141 years ago checks with the orbit of the "new" Rigollet comet. It is possible that the two comets are not the same, Mr. Cunningham reports, but they are definitely of the same family and very probably identical. If the new comet is the same one, this is the first time it has been sighted since its original discovery.

Science News Letter, August 12, 1939

AGRICULTURE

Poultry Raising Big Business; Norway Hens Are Fed Milk

RAISING chickens used to be one of the side lines of farming relegated to the farmer's wife, but nowadays poultry raising is big business.

Speaking at the Seventh World Poultry Congress meeting in Cleveland, Prof. Dr. H. C. L. E. Berger of The Hague, Netherlands, showed that in the United States keeping chickens is a $1,500,000,000 industry whose product exceeds in value that of cattle raising by some $200,000,000 yearly and tops the value of the nation's corn crop by $300,000,000.

From allowing fowls to roost in trees and scratch for their living in the barnyard, modern poultry raising developed into specially fed chickens in modern housing that rivals and even excels many a hovel sheltering some of the people of the United States who are "ill-fed, ill-clothed and ill-housed."

The major problem of the industry, reported by Prof. D. R. Marble of Pennsylvania State College, has been the alarming increase in mortality among laying fowl in the last 10 years which seems to be due to a form of paralysis.

Studies at Penn State show that from 1927 to 1932 mortality increased, among the flocks, from around 39% to nearly 50% fatalities.

Any breeding prior to 1932, Prof. Marble pointed out, centered around improvements in egg production and the ability of the eggs to hatch. Since that time the increase in mortality has led to intensive efforts to increase viability; or the ability to live healthfully.

Prof. Marble described breeding tests which have lowered mortality to 20% (a 150% improvement over previous 50%) and which, at the same time, have increased egg production.

Breeding experiments at Cornell University agree with the Penn State tests. The three-man research team of Prof. F. B. Hutt, and Drs. J. H. Bruckner and R. K. Cole, took chickens which had a mortality of 64% before selective breeding and cut the rate of death to 41% in some cases.

How scientists are dodging the short grain-growing season of the far north by feeding potatoes and milk was described to the Congress by Ivar Finne of Hvalstad, Norway. The egg production was increased about 7% by the method.

Science News Letter, August 12, 1939

AERONAUTICS

Million Dollars a Year Asked for New Mail Route

PAN AMERICAN Airways will ask the Civil Aeronautics Authority for more than a million dollars a year in mail pay to make up operating losses on its forthcoming route from San Francisco to New Zealand, its application for the right to fly the airway revealed.

Fortnightly service in a Boeing-type plane similar to its Atlantic and Pacific flying boats will produce income of $410,388 the first year and $475,428 the second year, it is estimated. Losses before the mail has been paid for will total $1,080,000 and $1,060,000 respectively. President Roosevelt has already asked Congress to appropriate $900,000 for mail pay on the route.

Major changes in both the type of airplanes used and the route to be followed within two years are foreshadowed in the application. Failure to make estimates of income and expenses beyond two years is explained by the note, "no estimate is now practical on account of anticipated increases in schedule frequency and changes in the route and equipment."

An average of 12 or 13 passengers a trip is expected, totaling 660 passengers the first year and 708 the second. One of the 41-ton Boeing clippers will leave from San Francisco every other Sunday, returning a week from the following Friday.

A stop at Los Angeles is scheduled for the outward trip at the beginning of the service, with a similar stop planned for the inward trip by the end of the first year of service. The Navy base at San Pedro will be used as the Los Angeles port of call.

Mail loads are expected to total 5,916 pounds the first year and 7,092 pounds the second. Express cargoes will add up to 17,076 pounds and 18,132 pounds respectively.

Only one of the $672,000 giant planes is needed for the route because of the possibility of interchanging it with similar planes used on the San Francisco-Manila-Hong Kong run which has been flown for nearly four years.

Science News Letter, August 12, 1939

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•First Glances at New Books

Evolution

THE LIVING THOUGHTS OF DARWIN—Julian Huxley assisted by James Fisher—*Longmans, Green,* 151 p., $1. Excerpts from the Origin of Species, the Descent of Man, and Darwin's more technical books, selected by the British biologist. This is a good introduction to the originals, for the book consists largely of ample quotations.

Science News Letter, August 12, 1939

Chemistry

METHODS FOR THE DETECTION OF TOXIC GASES IN INDUSTRY. Leaflet No. 3, Sulphur Dioxide, 6 p., 75c.; Leaflet No. 4, Benzene Vapour, 9 p., 10c.; Leaflet No. 5, Nitrous Fumes, 9 p., 10c.—*British Library of Information.*

Science News Letter, August 12, 1939

Photography

PHOTOGRAPHY BY INFRARED—Walter Clark—*Wiley,* 397 p., $5. Dr. Clark, scientist of Eastman Kodak's research laboratory, links theory and practice and shows the value of infrared photography in such widely diversified fields as astronomy, the study of paintings, forged and secret documents, aerial photography and photomicrography. An excellent bibliography is given from the technical literature as well as a very complete index.

Science News Letter, August 12, 1939

Hygiene

A COLLEGE COURSE IN HYGIENE—K. Frances Scott—*Macmillan,* 232 p., $2.50. More concise and direct than the usual college hygiene text book is this one prepared by the associate professor of hygiene at Smith College. Numerous references for supplementary reading are given and the text is both enlivened and illustrated by drawings and charts.

Science News Letter, August 12, 1939

Medicine

HAY-FEVER, What To Do About it!—Harry S. Bernton—*Ransdell,* 76 p., $2. See p. 107.

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Medicine

PARENTHOOD: Design or Accident? (A Manual of Birth Control)—Michael Fielding; Preface by H. G. Wells—*Vanguard,* 239 p., $2.50. The pros and cons of birth control and also of the various methods of contraception are clearly and simply given. An unusual feature of the book is the list of birth control clinics in the United States and the list of manufacturers and retailers of contraceptives. The publishers state that the sale of the book is "restricted to responsible adults" and that due to existing laws on the dissemination of birth control information it can be sold only to physicians or upon a physician's prescription.

Science News Letter, August 12, 1939

Philosophy

THE KANTIAN PHILOSOPHY OF SPACE—Christopher Browne Garnett Jr.—*Columbia Univ. Press,* 287 p., $3.50. George Washington University's associate professor of philosophy re-examines the views of the famous philosopher Kant, on the nature of space, which were developed in the years between 1747 and 1787.

Science News Letter, August 12, 1939

Aeronautics

AIR WAR; Its Psychological Technical and Social Implications—W. O'D. Pierce—*Modern Age Books,* 224 p., 50 c. Another of the aerial horror stories. It goes into the psychology of the war pilot, the warplane manufacturer, technical developments, the basis of civilian and military morale. This is a thought provoking volume even though some of its statements of what the airplane can do are exaggerated.

Science News Letter, August 12, 1939

Photography

NEW PATHS IN PHOTOGRAPHY — Andreas Feininger—*American Photographic Publishing Co.,* 62 p., 47 pl., $2.75. A book of photographs showing how unusual photographic techniques can be used to obtain striking graphic effects.

Science News Letter, August 12, 1939

Astronomy

ASTRONOMY—William T. Skilling and Robert S. Richardson—*Holt,* 579 p., $3. A new textbook in astronomy that is clear and pleasingly written, authoritative and well illustrated. Unusual emphasis has been placed on certain topics, particularly in the case of two chapters on the sun. "This has been thought advisable," state the authors, "not only because the solar system is (to man) the most important, but because some lines of recent research that seem important are not readily available outside technical literature."

Science News Letter, August 12, 1939

Economics

RESIDENTIAL BUILDING — Lowell J. Chawner—*Gov't Print. Off.,* 19 p., 10c. (U. S. National Resources Committee). First of new series of monographs.

Science News Letter, August 12, 1939

Architecture—Engineering

HOUSING FOR THE MACHINE AGE — Clarence Arthur Perry — *Russell Sage Foundation,* 261 p., $2.50. Another of the many Russell Sage Foundation books on town and city planning. Construction techniques, neighborhood units, single-family sections, apartment house neighborhood units, and other phases of the problem of housing in the twentieth century are discussed.

Science News Letter, August 12, 1939

Engineering

PUBLIC WORKS ENGINEERS' YEARBOOK, 1939, Including the Proceedings of the 1938 Public Works Congress—*American Public Works Association,* 457 p., $3.50.

Science News Letter, August 12, 1939

Sociology

REFUGEES (The Annals, Vol. 203)—Francis J. Brown, ed.—*American Academy of Pol. and Soc. Science,* 271 p., $2, paper; $2.50, cloth.

Science News Letter, August 12, 1939

Public Health

HEALTH OFFICERS' MANUAL — J. C. Geiger—*Saunders,* 148 p., $1.50. The director of the public health department for the city and county of San Francisco gives in this useful manual directions and advice on organization and administration of health departments generally. Subjects covered range from birth and death certificates to politics and publicity.

Science News Letter, August 12, 1939

Psychology

THE CHOSEN BABY — Valentina P. Wasson—*Carrick and Evans,* $1.50. Cute pictures supplement a brief text intended to "make the first explanation of adoption as happy as it is true."

Science News Letter, August 12, 1939

Technology

THE STEEL SQUARE—Gilbert Townsend—*American Technical Society,* 96 p., $1.25. A manual of the use of the steel square, the carpenter's "handbook, instructor and tool without price."

Science News Letter, August 12, 1939

Chemistry

CASEIN AND ITS INDUSTRIAL APPLICATIONS—Edwin Sutermeister and Frederick L. Browne—*Reinhold,* 433 p., $6.50. This is an almost completely rewritten edition of the valuable book which first appeared 12 years ago. In those years the uses of casein have increased enormously and the present work authoritatively reviews the entire field through 1938.

Science News Letter, August 12, 1939